

CLAIMS

1. A system for cleaning tubing used for conducting a fluid therethrough, the tubing being connected to an inlet pipe (5) and an outlet pipe (9), the system having:

- a plurality of cleaning balls (20) for circulating with the fluid through the tubing;
- a separator (12) disposed at the outlet pipe (9) and arranged to separate the cleaning balls (20) from the fluid, said separator comprising perforations which allow the fluid to flow through but not the cleaning balls (20);
- a recirculating means comprising:
 - a housing (21) arranged to collect the cleaning balls (20), the housing (21) having a first compartment (19) and second compartment (27) separated by an apertured partition (28), the apertured partition (28) being arranged to allow the fluid to pass through to the second compartment (27) but not the cleaning balls (20);
 - a ball supply pipe (24) having an entrance (26) coupled to a first opening on the first compartment (19) of the housing (21) and an exit (3) coupled to a first opening on the inlet pipe (5);
 - a fluid supply pipe (23) having an entrance (2) coupled to a second opening on the inlet pipe (5) and an exit (22) coupled to a second opening on the first compartment (19) of the housing (21);
 - a fluid return pipe (16) having an entrance (30) coupled to an opening on the second compartment (27) of the housing (21) and an exit (14) coupled to an opening on the outlet pipe (9);
 - a ball return pipe (17) having an entrance (13) coupled to an opening on the separator (12) and an exit (31) coupled to a third opening on the first compartment (19) of the housing (21);
 - a means for supply of cleaning balls to the inlet pipe (5) whereby a high pressure is formed at the entrance (2) of the fluid supply pipe (23) and a low pressure is formed at the exit (3) of the ball supply pipe (24), the difference in pressure causing a transfer of cleaning balls (20) from the housing (21) to the inlet pipe (5);
 - and a means for a return of cleaning balls (20) to the housing (21) whereby a high pressure is formed at the entrance (13) of the ball return pipe (17) and a low pressure is formed at the exit (14) of the fluid return pipe (16), the difference in pressure causing a transfer of cleaning balls (20) from the separator (12) back to the housing (21), wherein said recirculating means, said means for supply of cleaning balls and said means for return of cleaning balls are arranged to selectively transfer the plurality of cleaning balls (20) from the inlet pipe (5) to the outlet pipe (9), characterized in that said separator (12) comprises rectangular perforations (32) which allow the fluid to flow through but not the cleaning balls (20) and in that said system further comprises means (10) to rotate the fluid and the cleaning balls (20) at the outlet pipe (9) before the separator (12) and cooperating with said rectangular slots (32) for increasing the number of collisions between said cleaning balls (20) so as to remove the dirt accumulated on the surfaces of the cleaning balls (20) after their passage through the tubing (8).

2. A cleaning system according to claim 1, wherein the recirculating means further comprises a first valve (V1) disposed along the fluid supply pipe (23), a second valve (V2) disposed along the fluid return pipe (16), a first one-way valve (CV1) disposed along the ball supply pipe (24), and a second one-way valve (CV2) disposed along the ball return pipe (12); the first one-way valve (CV1) being operative to transfer the cleaning balls (20) from the housing (21) to the inlet pipe (5) and the second one-way valve (CV2) being operative to transfer the cleaning balls (20) from the separator (12) to the housing (21).

3. A cleaning system according to claim 1 or 2, wherein the recirculating means further comprises a third valve (HV2) disposed along the ball return pipe (17) and a fourth valve (HV1) disposed along the ball supply pipe (24).
 4. A cleaning system according to any one of the preceding claims, wherein said separator (12) is in a shape of a funnel.
 5. A cleaning system according to claim 4, wherein said perforations in the form of rectangular slots (32) have a length direction not parallel to the centre axis of the funnel.
 6. A cleaning system according to claim 5, wherein said rectangular slots (32) have a length direction inclined clockwise/anti-clockwise, as viewed in the fluid flow direction.
 7. A cleaning system according to any one of the preceding claims, further comprising means (4) to rotate the fluid and the cleaning balls (20) at the inlet pipe (5) before the tubing (8).
 8. A cleaning system according to any one of the preceding claims, wherein the direction of rotation of the rotational means at the outlet pipe (9) before the separator (12) is opposite to the length direction of said rectangular slots (32).
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